

ORIGINAL RESEARCH

A Seropositive Study of Hepatitis E Virus (HEV)

Tejashree A.¹, Raghavendra Rao M², Archana Hegde M³, Deepashree R⁴, Shwetha Bai D⁵

ABSTRACT

Introduction: HEV is an important public health concern as a major cause of enterically transmitted hepatitis worldwide. The aim of this study was to determine the sero-prevalence of Hepatitis E virus in case of jaundice.

Materials and Methods: Serum samples from patients with high bilirubin value were tested for IgM anti-HEV by ELISA. (MP Diagnostics, MP Biomedical Asia Pacific Pvt.Ltd). The ELISA was performed according to the manufacturer's instructions for washing, detection and calculation of cut-off value.

Results: Of all 268 serum samples tested, 36(13.43%) patients were positive for anti HEV IgM and 232(86.56%) were negative. Sero-prevalence was high in the age group of 21-50years (63.88%). Among 36 positive cases, 23(63.33%) male and 13(36.11%) female showed positive result for hepatitis E viral infection. Among 13 positive females, one of the patients was found to be pregnant and was tested positive for HEV IgM antibodies. 45(41.4%) patients showed increased bilirubin range between 3.0 -6.0mg/dl.

Conclusion: Anti- HEV IgM is a reliable and sensitive marker for diagnosis of recent HEV infection when suspecting a case of enterically transmitted hepatitis. study analyzed serological and biochemical parameters of jaundice in patients with features suggestive of acute viral Hepatitis.

Keywords: Hepatitis E Virus (HEV), Jaundice, Pregnancy, ELISA.

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INTRODUCTION

Hepatitis E virus (HEV) infection is endemic in Asia and many parts of Africa, where it is a leading cause of sporadic

and epidemic acute hepatitis.¹ HEV is primarily transmitted through the feco-oral route. Outbreaks are typically associated with contaminated drinking water.²⁻⁴ HEV usually causes an acute self-limiting illness like HAV. Fulminant disease occurs in about 10% of cases. In some areas it is the most common viral cause of hepatitis in adults and older children, causing major epidemics in the Indian subcontinent, Central and Southeast Asia, the Middle East, and parts of Africa.⁵ HEV is a non-enveloped, spherical, positive-stranded RNA virus. HEV is the sole member of the genus *Hepevirus* within the family *Hepeviridae* and has a 7.2-kb positive-sense RNA genome.⁶ Five major genotypes have been identified so far.⁷ The viruses in the genotypes 1 and 2 are maintained among only humans, while those in the genotypes 3 and 4 are found in pigs or wild animals.⁸ However, infections of human with genotypes 3 and 4 via zoonotic transmission or blood transfusion were reported in the developed countries, such as Japan and the United States,⁹⁻¹¹ suggesting that hepatitis E caused by infection with genotypes 3 and 4 of HEV is an important emerging infectious disease. The viruses in the genotype 5 are of avian origin and are thought to be un-infectious to humans.¹²

Man is the natural host for HEV, but certain non-human primates, e.g. chimpanzees, cynomolgus monkeys are reported to be susceptible to natural infection with human strains of HEV.¹³ Symptomatic HEV infection is most common in young adults aged 15-40 years and is uncommon in children. Although HEV infection is frequent in children, it is mostly asymptomatic and anicteric.¹⁴ The incubation period following exposure to HEV ranges from 3 to 8 weeks, with a mean of 40 days.¹⁵ Typical signs and symptoms of hepatitis include jaundice, anorexia, hepatomegaly, abdominal pain and tenderness, nausea, vomiting, and fever, although the disease may range in severity from subclinical to fulminant.¹⁶

Fulminant hepatitis cases in pregnancy may reach a mortality rate of 20% in the 3rd trimester. Premature deliveries with high infant mortality of up to 33% are also observed.¹⁷ Some of the complications of pregnancy are toxemia with hypertension, proteinuria, edema, and kidney lesions. By directly or indirectly affecting the kidneys, HEV might precipitate eclampsia and lead to increased mortality in pregnant women.¹⁸ In general, less than 1% of patients with clinical HEV die, but case fatality ratios among pregnant women have been reported to be as high as 6% to 20%.¹⁹ Intrauterine infection (\pm stillbirth) is common and the mortality rate may be as high as 15-20%. Common cholestatic jaundice can persist for several weeks. The occurrences of sporadic HEV infections in humans may maintain transmission during inter epidemic

periods. There is no evidence for sexual transmission or for transmission by transfusion.²⁰

MATERIALS AND METHODS

Study was performed in the Department of Microbiology, JSS Medical College, Mysore. Ethical approval was obtained from the institutional ethical review board. Serum samples from patients with high bilirubin value were tested for IgM anti-HEV by ELISA. (MP Diagnostics, MP Biomedical Asia Pacific Pvt Ltd). The ELISA was performed according to the manufacturer's instructions for washing, detection and calculation of cut-off value.

RESULTS

Total sample tested for anti HEV IgM

Of all 268 serum samples tested, 36(13.43%) patients were positive for anti HEV IgM and 232(86.56%) were negative.

Age wise distribution

Sero-prevalence was high in the age group of 21-50years (63.88%), followed by above 50 years (19.44%) of age and in 1-20years (16.66%) age group less prevalence was seen.

Sex wise distribution

Among 36 positive cases, 23(63.33%) male and 13(36.11%) female showed positive result for hepatitis E viral infection.

Bilirubin range

Biochemical markers all were correlated, in which elevated bilirubin in serum were noted. Lager number of patients was showing increased bilirubin range between 3.0 -6.0mg/dl, seen in 45(41.4%) patients in their lab investigation and smallest range was comprised by 1.0 -3.0mg/dl, among 8(7.36%) patients.

Symptom statistics

50(46%) Patients showed the case of yellowish discoloration of skin, which is the major symptom. This is followed by abdominal pain 20(18.4%) and least observed was fever in 10(9.2%) of patients.

DISCUSSION

ANTI- HEV IgM is a reliable and sensitive marker for diagnosis of recent HEV infection when suspecting a case of enterically transmitted hepatitis. This study analyzed serological and biochemical parameters of jaundice in patients with features suggestive of acute viral Hepatitis. In the present study sero-prevalence was high among the age group of 21-50 years than compared to 15-25 years. Similar finding were also observed by Dr. Jayshri D. Pethani et al²² in their study sero-prevalence was high in age group of 21-30years of age. Males (63.33%) were more prone than females (36.11%) in

our study. Similar finding were also observed by Dr. Jayshri D. Pethani et al²² in their study sero-prevalence was high in Males than in females. Biochemical markers were correlated, in which elevated bilirubin level in serum were noted. Different range and amongst them most frequently noted is depicted. Largest numbers of patients were showing increased bilirubin range between 3.1-6.0 mg/dl, showed in 45 (84.90%) patient's lab investigation & smallest range was comprised by 0-1.0mg/dl, in 8 patients (15.09%). This was similar to the result finding of Dr. Jayshri D. Pethani et al.²² Among 13 positive females, one of the patients was found to be pregnant and was tested positive for HEV IgM antibodies. Pregnancy immunological changes occur for maintenance of probably antigenic fetus in maternal environment by somewhat suppressing maternal immunity, which leads to increased risk of infection or aggravates present infection. Adding to that increased level of steroid hormones during pregnancy promotes virus replication and growth, predisposing to hepatic dysfunction which ultimately ends in fulminant cases.²² Seroprevalance of HEV in pregnant women is potentially serious because of its high mortality rate (10-25%). All confirmed cases were correlated well with biochemical markers which indicate that clinical suspicion can be made on such ground to start empirical treatment.²²

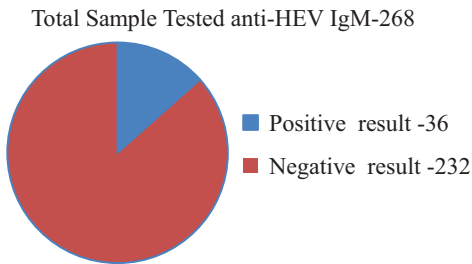
In age group of 1-20 years we have anti HEV IgM around 16.66% which was similar to the result of B. Mohanavalli et al²³ and is significantly lower than the HEV exposure rates of 64% of children below 5 years and 59% below 10 years reported by Aggarwal et al.,²⁵ and also lower than 23.8% as reported by Mathur et al.²⁶ However it was similar to the results of 0-9% by Arankalle et al²⁴ and studies from Somalia²⁷ and Hong Kong²⁸ where a low prevalence to HEV has been documented. In this study, 2.7% of children had been exposed to HEV, whereas none of the children had these antibodies in the study by Arankalle et al.²⁴

In developing counties, people living in overcrowded area, which reflects the poor sanitation and low standard life style, all these things, contributes to the transmission of infection. Improved hygiene and life style can reduce illness. The seroprevalence of HEV throughout India seems to be similar and exposure pattern to HEV seems to be comparatively low. Since, this virus is spread by oral-fecal route; it would be of utmost importance to provide safe drinking water and proper sanitary conditions.

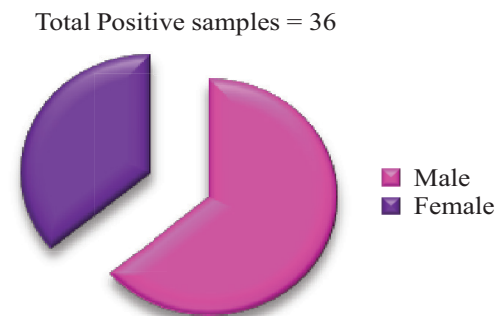
HEV is an important public health concern as a major cause

Age wise distribution	No. of samples
1-10years	1(2.7%)
11-20years	5(13.88%)
21-30years	8(22.22%)
31-40years	9(25%)
41-50years	7(19.44%)
50years and above	6(16.66%)

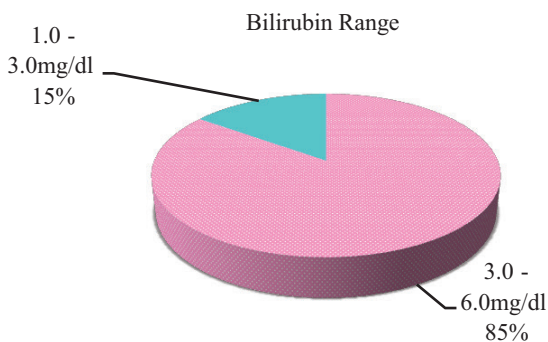
Table-1: Showing age wise distribution of anti HEV IgM isolates.



Graph-1: Graph showing total samples tested for anti HEV IgM



Graph-2: Graph showing Sex wise distribution of anti HEV IgM isolates



Graph-3: Graph showing Bilirubin range of anti HEV IgM isolates.

of enterically transmitted hepatitis worldwide. However, locally acquired HEV infection is also emerging in overpopulated regions. The infection is caused by different genotypes, depending on whether it is travel-related or autochthonous. Conventional RT-PCR followed by sequencing of PCR products can identify HEV genotype by molecular characterization and depending on the region, the subtype can also be detected. Thus helping in defining the origin of infection and tracing the source of contamination. This approach is certainly valuable to investigate the molecular epidemiology of acute hepatitis E in countries where co-circulation of different genotypes occurs.

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